WHAT IS CLAIMED IS:

1. An apparatus for determining liquid water content in a body of air, comprising a probe system comprising a probe configured to permit measuring a rate at which ice accretes on the probe from supercooled water in a body of air; a sensing circuit to sense a parameter that changes as ice accretes on the probe and to provide an output signal which is a function of ice accretion on the probe, means for providing signals indicative of air temperature and relative velocity of the body of air as air moves relative to the probe; a logic device communicatively connected to the probe system, configured to accept inputs from the sensing circuit, and inputs representing air temperature and relative velocity of the body of air from the means for providing, and a set of stored data providing an input to the logic device, the logic device performing operations on the inputs including determining the rate of change of ice accretion, and producing an output indicating liquid water content in the body of air using the set of stored data.

2. The apparatus of claim 1, and a heating device communicatively connected to the logic device, and configured for heating the probe sufficiently when activated by an output from the logic device, to diminish the ice accreted on the probe.

3. The apparatus of claim 1, wherein the logic device is configured to perform an operation on the inputs, including the stored data comprising calculating the liquid water content of the body of air when the liquid water content is above the Ludlam

Limit.

4. The apparatus of claim 1, wherein the probe comprises a surface on which a ice accretes, and a sensor associated with said surface for determining when ice accretes thereon, to provide the output signal.

5. The apparatus of claim 1, wherein the probe comprises a surface on which ice accretes, a source of light directed toward said surface, a sensor for sensing light back scattered from accretion of ice on the surface, said sensor providing the output signal.

6. The apparatus of claim 1, wherein the probe comprises a surface having an orifice therein, a pressure sensor connected to the orifice, and the pressure sensor providing the output signal based on a function of ice blocking the orifice.

7. The apparatus of claim 6, wherein the output signal is based on measurement of time from when ice starts to block the orifice until the orifice is completely blocked.

8. The apparatus of claim 1, wherein said probe comprises a surface having a microwave wave guide thereon, a circuit connected to the microwave wave guide including a comparator for comparing signals directly from a source connected to the wave guide and from an output of the wave guide to determine changes when the source has ice accreting thereon, said comparator providing the output signal.

9. An apparatus for determining liquid water content in a body of air comprising a probe, a sensing device associated with the probe that provide a signal that changes predictably as a function of a quantity of ice accreted on the probe; the sensing device including a probe sensing circuit configured to provide a signal indicating the rate of ice accretion on the probe; a logic device, communicatively connected to the probe sensing circuit and configured to accept inputs comprising the signal indicating the rate of ice accretion, the temperature of the body of air and the relative airspeed past the probe, the logic device performing operations on the inputs and producing outputs based on the operations; a memory storage device, communicatively connected to the logic device, configured to supply stored data as an input to the logic device, including stored data representing measurements of liquid water content under known conditions of rate of change of the signal indicating the rate of ice accretion on the probe, the temperature of the body of air and the relative airspeed past the probe, and the logic device correlating the rate of change of the signal indicating the rate of ice accretion on the probe, the temperature of the body of air and the relative airspeed past the probe with the stored data to provide an output indicating liquid water content in the body of air.

10. The apparatus of claim 9, wherein the logic device is configured to perform at least one cycle of temporarily activating a heating device to heat the

probe, determining the rate of change of ice accretion of the probe after the heating device has been deactivated, and then correlating the determined rate of change of ice accretion after heating with the other inputs.

11. The apparatus of claim 10, wherein the set of stored data comprises data from previous tests of the probe under controlled conditions, configured to serve as a basis for comparison with new inputs.

12. A method of determining liquid water content in an airflow, for signaling icing conditions for an aircraft, wherein the aircraft is moving relative to the air flow, including providing an ice detector probe on the aircraft, providing an ice detector sensor on the probe having an output that changes as ice accretes on the probe, determining changes in the output of the ice detector sensor to provide a rate signal indicating rate of ice accretion on the ice detector probe, determining the rate of change of the rate signal, determining airspeed of the air vehicle, determining air temperature of the airflow, and correlating the parameters comprising the rate signal, the determined airspeed and the determined airflow temperature with previously established relationships between these parameters stored in one of a lookup table and algorithm for providing an output indicating liquid water content of the air.

13. The method of claim 12 further comprising, performing at least one cycle of heating the probe to remove ice accreted thereon, and repeating the steps

of determining the rate of change of the rate signal, the temperature, and the airspeed, and performing the correlating to provide a new output indicating liquid water content of the airflow.